

What is claimed is:

1. A sample chamber for a test specimen, the sample chamber comprising:
  - a main body;
  - at least one optical element, the at least one optical element having a surface for holding a test specimen, the at least one optical element being operatively connected to the main body by a force applied to the surface for holding the test specimen;
  - means for applying a force to a continuous portion of the surface for holding the test specimen of the at least one optical element to operatively connect the at least one optical element to the main body, the means for applying a force comprising at least one sealing element, the at least one sealing element being configured and disposed between the main body and the at least one optical element; and
  - wherein the main body, the at least one optical element and the at least one sealing element form a sample well upon the at least one optical element being operatively connected to the main body by the means for applying a force.
2. The sample chamber of claim 1 wherein the at least one sealing element comprises at least two sealing elements, and the at least two sealing elements are disposed substantially concentrically.
3. The sample chamber of claim 2 wherein the means for applying a force further comprises a vacuum connection, the vacuum connection being configured and disposed to provide a vacuum force between the at least two sealing elements to operatively connect the at least one optical element to the main body using the vacuum force.
4. The sample chamber of claim 3 wherein the vacuum connection comprises:
  - an aperture in the main body in communication with a space between the at least two sealing elements;
  - a connection port at least partially disposed in the aperture; and

means for attaching the connection port to the aperture in the main body.

5. The sample chamber of claim 1 wherein the at least one optical element is configured to permit visual inspection of a test specimen in the sample well.
6. The sample chamber of claim 2 wherein the at least two sealing elements comprises one of at least two O-rings, at least two gaskets and at least two washers.
7. The sample chamber of claim 1 further comprising:
  - at least one tube being configured and disposed to add or withdraw samples or specimens from the sample well; and
    - wherein the main body comprises at least one aperture in communication with the sample well and the at least one tube is at least partially disposed in the at least one aperture.
8. The sample chamber of claim 7 further comprising means for attaching the at least one tube to the at least one aperture in the main body.
9. The sample chamber of claim 8 wherein:
  - the at least one aperture comprises a first aperture and a second aperture; and
    - the at least one tube comprises a first tube attached to the first aperture to add samples or specimens to the sample well and a second tube attached to the second aperture to withdraw samples or specimens from the sample well.
10. The sample chamber of claim 10 wherein the first aperture and the second aperture are disposed on opposite sides of the sample well to provide for substantially laminar flow of samples or specimens through the sample well.
11. The sample chamber of claim 1 wherein:
  - the main body comprises one of a plastic material and a metallic material; and
    - the at least one optical element comprises one of a glass material and a plastic material.

12. The sample chamber of claim 1 wherein the at least one optical element is coated with at least one of an electrical conductivity coating material, an antireflective coating material and a transmission enhancing coating material.

13. The sample chamber of claim 1 wherein the at least one sealing element is at least one adhesive ring.

14. A chamber comprising:

a body;

at least one optical element, the at least one optical element being operatively connectable to the body upon a force being applied to a planar surface of the at least one optical element;

a connecting arrangement to connect the at least one optical element to the body upon a vacuum force being applied to the connecting arrangement and the planar surface of the at least one optical element, the connecting arrangement comprising at least one pair of sealing elements, the at least one pair of sealing element being disposed substantially concentrically to form a space between the at least one pair of sealing elements, the at least one pair of sealing elements being disposed between the body and the at least one optical element; and

wherein the body, the at least one optical element and the at least one pair of sealing elements form a chamber upon a vacuum force being applied to the connecting arrangement and the planar surface of the at least one optical element to connect the at least one optical element to the body.

15. The chamber of claim 14 wherein the connecting arrangement further comprises:

the body having an aperture in communication with the space between the at least one pair of sealing elements;

a connection port at least partially disposed in the aperture; and

means for attaching the connection port to the aperture in the body.

16. The chamber of claim 15 wherein:

the at least one optical element comprises a first optical element and a second optical element, the first optical element being disposed opposite the second optical element to form two sides of the chamber; and

the at least one pair of sealing elements comprises a first pair of sealing elements and a second pair of sealing elements.

17. The chamber of claim 16 wherein the first optical element and the first pair of sealing elements are disposed on opposite sides of the body from the second optical element and the second pair of sealing elements.

18. The chamber of claim 16 wherein the first optical element and the first pair of sealing elements and the second optical element and the second pair of sealing elements are disposed on one side of the body.

19. The chamber of claim 14 further comprising:

the body having a first aperture and a second aperture in communication with the chamber;

a first tube at least partially disposed in the first aperture to add samples or specimens to the chamber; and

a second tube at least partially disposed in the second aperture to withdraw samples or specimens from the chamber.

20. The chamber of claim 14 wherein the chamber formed by the body, the at least one optical element and the at least one pair of sealing elements upon application of a vacuum force is a hybridization chamber.